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Abundance and Run Timing of Adult Salmon in Henshaw Creek, Kanuti National Wildlife Refuge, Alaska, 2006

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Cover photo of Henshaw Creek weir taken July 20, 2006

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Brandy Berkbigler and Thomas McLain

Abstract

During 2006, a resistance board weir was installed on June 29 to record escapement information from Chinook *Oncorhynchus tshawytscha* and chum salmon *O. keta* in Henshaw Creek, a tributary of the Koyukuk River, Alaska. On June 30, 4 chum salmon were counted before high water. In 2006, the Henshaw Creek weir could not be operated effectively due to high water periods, making it impossible to collect data during the 2006 season.

Introduction

Henshaw Creek provides spawning and rearing habitat for Chinook *Oncorhynchus tshawytscha* and chum *O. keta* salmon. Henshaw Creek is located within the Kanuti National Wildlife Refuge (Refuge) and is a major tributary flowing into the Koyukuk River drainage. The Refuge is located near the villages of Allakaket, Alatna, and Bettles in north-central Interior Alaska. Chinook and chum salmon from Henshaw Creek contribute to the mixed stock subsistence and commercial fisheries occurring in the Yukon River drainage (USFWS 1993).

Within federal conservation units, continued subsistence use by rural residents of fish and wildlife resources and the conservation of those resources are mandated in the Alaska National Interests Lands Conservation Act (1980). Declines of Yukon River salmon stocks began in the late 1990s (Kruse 1998) and led to harvest restrictions, complete fishery closures, and spawning escapements below management goals (Salomone and Bergstrom 2004.). Management of individual stocks does not occur and accurate escapement data are limited throughout the Yukon River drainage. Escapement estimates prior to 1999 were primarily from aerial surveys (Barton 1984) which are highly variable and are only an index of relative run strength. The inseason management of the salmon fisheries is conducted on information provided from the preseason outlook based on parent stock returns, test fisheries, Pilot Station sonar, run strength from lower river escapement projects, and subsistence and commercial harvest reports (Vania and Golembeski 2000).

Salmon spawning escapement projects using fish weirs and counting towers provide accurate information for evaluation of management practices. Prior to 1999, three stock status and escapement projects were conducted in the Koyukuk River drainage to enumerate salmon stocks; the Gisasa River weir (O'Brien 2006), South Fork Koyukuk River weir (Wiswar 1998), and the Clear Creek counting tower (C. Kretsinger, Bureau of Land Management, Fairbanks, personal communication). After 1997, the South Fork Koyukuk River weir study was abandoned due to persistent high water events that prevented operation of the project. A counting tower was operated on Henshaw Creek in 1999 (VanHatten 1999). In 2000, the weir formerly used on the South Fork Koyukuk River was moved to Henshaw Creek, where high water events would be less likely to compromise the performance of the weir and still maintain an escapement project in the upper

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Koyukuk River drainage. Additionally, Henshaw Creek is classified as an index stream for Chinook and summer chum salmon (ADF&G 2000) where there is historic information on salmon escapement. Aerial survey estimates for escapements in Henshaw Creek since 1960 ranged from six to 593 Chinook salmon and 12 to 15,397 chum salmon (Barton 1984; Appendix 1). The Henshaw Creek escapement project was continued in 2006. The objectives of the study were to determine (1) daily escapement and run timing of adult salmon, (2) age, sex, and length (ASL) compositions of adult salmon, and (3) the presence and movement of resident fish.

Study Area

Henshaw Creek is a small clear water tributary of the Koyukuk River in north-central Alaska (66° 33'N, 152° 14' W) (Orth 1967; Figure 1). The headwaters originate in the Alatna Hills and the river flows southeasterly for 144 km before entering the Koyukuk River. The climate of this area is cold and continental, which is characterized by extreme seasonal temperature variations and very low precipitation. There is an extreme range in air temperature with recorded temperatures from 18° to 21° C in summer months to recorded lows of -57° C in winter months (USFWS 1993). Stream flows are highest during the spring months in response to snow melt with sporadic high discharge periods throughout the summer in response to local rain showers.

Channel configuration is typically meandering with alternating cut banks and gravel bars. The substrate is primarily medium to large gravel (8 - 64 mm) and cobble in the higher velocity currents and sand and silt in the pools. The weir site is approximately 1.5 km upstream from the mouth of Henshaw Creek. The width of the channel at the weir site is about 30 m with an average depth of 0.6 m during most of the summer.

Methods

Weir Construction

A resistance board weir was used to collect escapement counts and biological information from adult salmon as they migrated into Henshaw Creek to spawn. The construction and installation of resistance board weirs was described by Tobin (1994). Each picket of the weir was made of schedule-40, polyvinyl chloride electrical conduit with 2.5 cm inside diameter and individual pickets spaced 3.2 cm apart. A live trap installed near mid-channel allowed salmon and resident fish species to be recorded as they passed through the weir.

Biological Data

Run timing and abundance of adult Chinook and chum salmon were estimated by recording and plotting the number of each species of fish passing through the weir each day. Due to high water that resulted in the weir operating for only one day, no biological data i.e., season totals; age composition, length and sex ratio were collected.

Results and Discussion

Weir Operation

In 2006, the Henshaw Creek weir was placed in operation on June 29. The start date of the project was based on previous years' run timing data. High water beginning on July 1 stopped operation of the weir, and prevented operation of the weir for the duration of the season. The weir was pulled on August 2. The weir was effective in allowing fish passage and as an aid in collecting biological information. The spacing between each weir picket (3.2 cm) prevented adult Chinook and chum

salmon from passing through the weir panels. However, small individuals of some non-salmon species, such as Arctic grayling Thymallus arcticus, longnose sucker Catostomus catostomus, northern pike Esox lucius, and whitefish (Coregoninae), likely passed undetected through the weir.

Biological Data

The weir was installed on June 29 and operated until July1 due to high water. Crew was on-site until August 3 but continuous high water precluded further operation of the weir. Four chum salmon (N=4) were observed moving through the trap on June 30. Up to that point no fish were observed. No season total, age composition, or length and sex ratios were collected. No other salmon were counted.

This is the first year since the weir began operation in 2000 that a total estimate could not be produced.

In 2006, the Henshaw Creek weir could not be operated effectively during high water periods, making it impossible to collect data during the 2006 season.

Acknowledgements

This was a joint project between USFWS and the Tanana Chiefs Conference (TCC) and the second year of a three year transition period to turn the project over to TCC. Appreciation is extended to those who contributed to this project. Nathan Collin, crew leader with the Fairbanks Fish and Wildlife Field Office spent the full summer at the weir and maintained the weir and camp during high water as well as assisting with setup and breakdown of the camp. We would like to thank the technicians from Allakaket who worked on the weir: Alvin Ned Jr. and Walter Bergman. As well as additional technicians; Carmen John, National Park Service volunteer, and Lisa Kangas, Fishery Intern, Tanana Chiefs Conference's Cultural and Natural Resources Program. We thank David Wiswar, Fishery Biologist with the Fairbanks Fish and Wildlife Field Office, for his expertise of weir installation and for setup and breakdown of camp. We are also grateful to Kanuti National Wildlife Refuge, Brooks Range Aviation, Bettles Lodge, Wright's Air Service and Sourdough Outfitters for logistical support.

Tom McLain and David Daum, Fishery Biologists with the Fairbanks Fish and Wildlife Field Office, reviewed this report.

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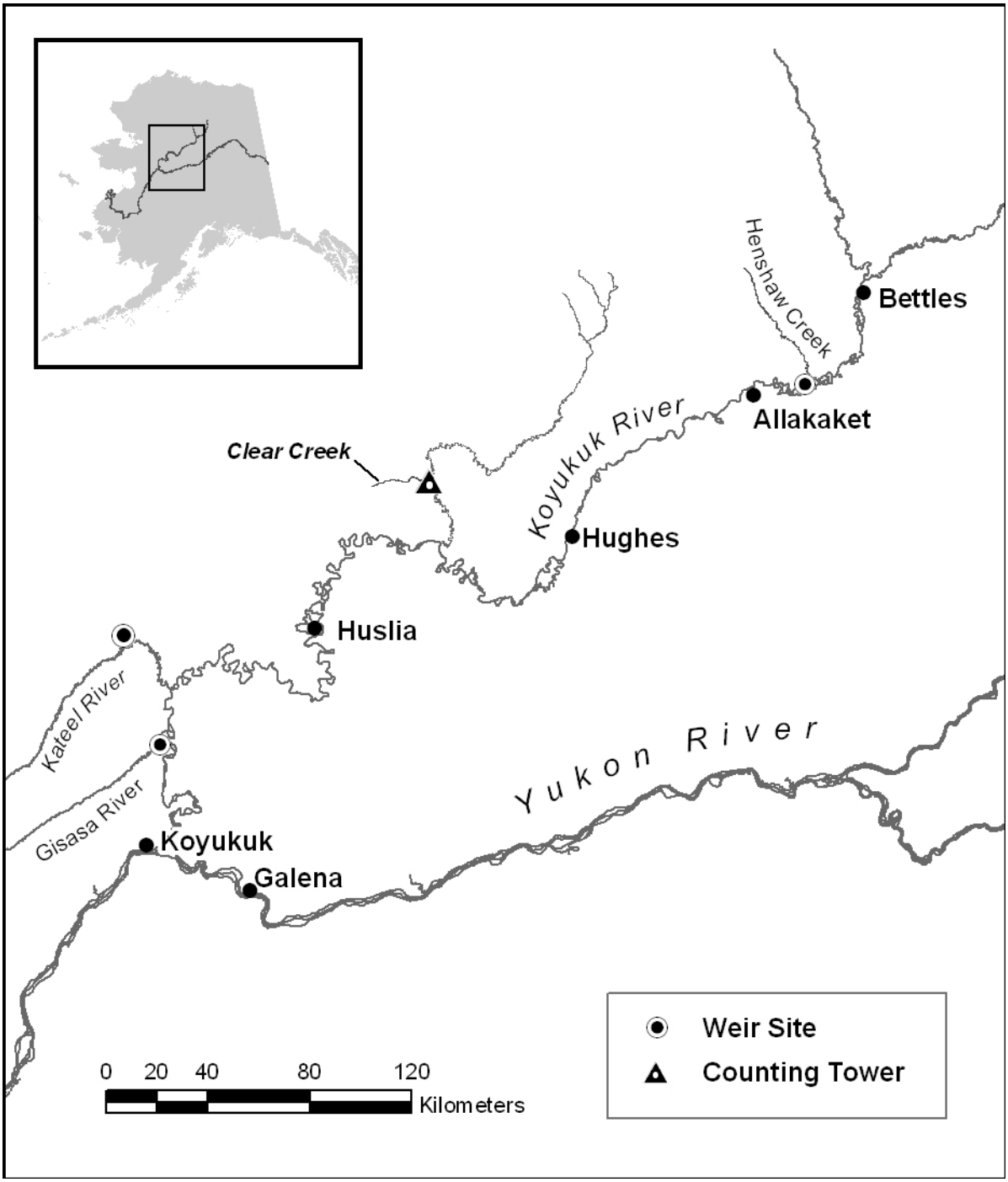

Figure 1. Location of the Henshaw Creek weir and other active and historical tributary escapement project sites in the Koyukuk River drainage, Alaska.

Appendix 1. Historical Chinook and summer chum salmon escapements for Henshaw Creek, Alaska 1969-2006. * indicates partial tower count in 1999 * indicates incomplete season in 2006**

	Aerial Index estimates			Counting tower estimates		Weir estimates	
Year	Chinook salmon	Chum salmon	Rating	Chinook salmon	Chum salmon	Chinook salmon	Chum salmon
1969	6	300	Not rated				
1975	118	1,219	Not rated				
1976	94	624	Fair				
1982	48	12	Fair				
1983	551	3,289	Good				
1984	253	532	Poor				
1985	393	3,724	Good				
1986	561	2,475	Fair				
1987	20	35	Not rated				
1988	180	1,106	Poor				
1990	369	1,237	Good-Fair				
1991	455	2,148	Good				
1994	526	2,165	Fair				
1996	138	24,780	Fair				
1998	97	151	Fair				
1999				12*	1,510*		
2000						244	27,271
2001						1,103	35,031
2002						649	25,249
2003						763	22,556
2004						1,248	86,474
2005						1,059	237,481
2006						0***	4***